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chemist—and I should use the word, "mere," with care, especially when one recalls such assemblies of scholars as are gathered in such a research laboratory as that of the Badische Anilin-und-Soda Fabrik, but if a young man plans for such a position, the remarks of Professor Kipping may well apply. But that suits well with the conditions of the past; what we are concerned with is what touches the present needs.

One feature of American manufacture is the remarkable development of machinery and power application; and a great lack in this development is the very absence of what should be the chemical-engineering side of it. Now such a nation as Germany has both sides. Why should not America also have both sides? But the only way to reform is to reform; and now that we see the need, it is only necessary to follow in the path indicated. We have a store of well-trained chemists. We have a store of engineers. We lack the adequate supply of practical chemical engineers. It is easy to produce this needed supply—by teaching the chemist engineering; and by giving him teachers who have been and are in touch with the practical. Moreover, there is a great need of reforming the methods of teaching chemistry. With the safeguarding of the curriculum by employing men who know and respect theory, it is feasible to start the student with the practical idea; then he will never get away from it, he will see it always, he will love it and he will use it. For he will learn the dignity and worth of putting theory into overalls; and in turn he will learn the method and value of dressing practise with the dignity of theory.

CHARLES S. PALMER

NEWTONVILLE, MASS.

AURORAL DISPLAYS

IN the issue of SCIENCE dated July 10, I described a remarkable illumination of the sky at Sandy Hook, N. J., on the evening of March 27. Since that date I have witnessed two more sky glows, one on the night of August 18, and another on September 4. I had been quite prepared for further exhibitions of

this kind, as a dispatch to the New York *Sun* from Washington, August 8, 1908, stated that there had been an unusual number of auroral displays or sky glows visible in Europe and the eastern part of the United States.

On August 18, I was at Murray Bay, Canada, on the lower St. Lawrence. The night of August 17-18 was cool, rainy and foggy. The afternoon of the eighteenth was windy and clear, and the evening was cool, calm and clear. The few days previous had been unusually warm. On the eighteenth, about 8 p.m., I first noted a rich glow in the west. This was followed, shortly afterwards, by the appearance of shafts spreading from about ten degrees north of west around by the north to almost due east. The illumination in some cases reached almost to the zenith. The shafts appeared and vanished with bewildering rapidity, and quite a number of spiral luminous clouds and persistent bright patches were visible. The illumination lasted until about ten o'clock. There was no moon, yet the general effect of the display was a diffused light about equal to that given by the moon at a quarter-phase.

The exhibition of the night of September 4 was noted at Fort Terry on Plum Island about ten miles from New London, Conn. The same succession in weather conditions had prevailed; hot weather followed by heavy rains, and clear cooler weather. The first indication was at 7:15 p.m., and consisted of a streamer about 60 degrees in length, rising from the horizon about ten degrees west of north. Other streamers in great number but much more attenuated appeared east of north. Some of these faded very quickly, to be followed by new ones, while others were quite persistent, and had a distinct motion towards the west. At about 8 o'clock a bright flat glow was noted almost due north, and shortly afterwards the northern illumination faded. At about 8:45 some peculiar striated luminous clouds appeared in the southwest, followed in turn by a few pale streamers due north. The display closed altogether about 9:30 p.m. It should be noted that the sky became somewhat cloudy towards the end of the display and

that the moon in the first quarter was unobscured by clouds most of the time.

FORT TERRY, N. Y., W. E. ELLIS
September 4, 1908

P. S.—Since furnishing the above, Mr. Donald Robertson, of Brooklyn, N. Y., writes me:

I saw another illumination last Friday, the fourth of September. I was at Lake Placid in the Adirondacks and had a fine view of it. It began at about eight o'clock and lasted until about nine or ten—I do not know which, as there was always a glow in the sky from eight to ten. In most respects, it resembled the one we saw at Murray Bay, but there was one difference. The heavens were lit up brighter than on August 18 and there were at times rainbow colors to be seen in the north.

I also wish to add that there was nothing in the displays of August 18 and September 4 that remotely resembled the steady eastern-western luminous patches of March 27. I am still of the opinion that the last was something more than an auroral exhibition.

Since writing my former account I have received several letters from scientists furnishing me opinions and latest explanations of auroral phenomena. The explanation that I advanced was not so much at variance with latest views.

In nearly all of the theories that have come to my notice, it is assumed that the sun is the only source of cathode rays, or the sun's action produces the cathode rays in our own atmosphere. The possibility that the earth may emit its own cathode rays does not appear to have been considered. W. E. ELLIS

FORT TERRY, N. Y.,
September 9, 1908

To THE EDITOR OF SCIENCE: In your issue of July 10 Mr. Wilmot E. Ellis refers to a remarkable case of illumination of the heavens which was observed in New Jersey on March 27 of this year. I was privileged to witness this same phenomenon from the uppermost deck of the R.M.S. *Adriatic* about 530 knots due east from Sandy Hook Light Ship. I had on several previous occasions observed spots or streaks of small dimensions in various parts of the northern heavens, sometimes rivaling

in brightness the Milky Way itself, but never had I known of sky-brightness as extensive and as pronounced as I did in this case. The night was perfectly clear and Venus shone so brightly that a streak of light was thrown upon the surface of the ocean. I watched the phenomenon during the last twenty minutes of its manifestation, the general characteristics being as recorded by other observers, though I believe its general position was lower on the western horizon. I noticed no trembling whatever in the shafts of light which developed towards the last.

I can hardly agree with your correspondent as to the nature of this brightness. His theory is practically that proposed by Chaplain Jones, U.S.N., in 1855 for the zodiacal light. I do not pretend to deny a corona to the earth and moon, but if due to disintegration of matter, as Mr. Ellis suggests, it is evident that to allow for an applicable corona we should require a degree of ionization of the atmosphere close to the earth—apart from that due to sunlight—incomparably greater than what we observe.

I have long believed that sky-brightness was either due to an after-glow on banks of moisture or dust in the upper reaches of the atmosphere, or else to the burning of cosmic dust clouds as the earth's atmospheric mantle passed through them. These dusts might either be traveling in set orbits like meteorites, or more probably they would emanate from the sun, either as a continuous outgrowing corona, or likely enough as an intermittent discharge from spots. Sunspot areas are, if anything, hotter than the rest of the photosphere, which would be explained by the heat-retaining power of material dusts (probably gaseous in character) present in the direct line of bolometric measurement. The magnetic disturbances often observed shortly after sunspot eruptions would be explained by the bridging of space by these atomic dusts, and their effect as ions or carriers of electricity from the earth to the sun. The time elapsing between the eruption and the magnetic effects would indicate the speed of travel of these particles which might be compared with the growth of solar red-

flames. It is not difficult to reconcile a theory such as this with that of Arrhenius.

ALFRED SANG

RECESSIVE CHARACTERS

For the past two years there has been exhibited at the Trenton (New Jersey) Agricultural Show a cow without trace of the body hairs. This cow was crossed with a normal bull, according to the owner, Mr. Frank Fraunfelter, of Pennsylvania, and a male calf was born last September which has the ordinary hairy coat. This result indicates that the presence of the hair follicles is dominant over their absence. This adds another case to the law that the presence of a quality is dominant over its absence or that a retrogressive or retarded condition is recessive to the more developed conditions. C. B. DAVENPORT

QUOTATIONS

THE PRESIDENCY OF THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY

THE Institute of Technology has now solved a problem of some delicacy and difficulty in selecting for the head of that institution Professor Richard C. MacLaurin, at present at the head of the mathematical physics department of Columbia University, and he has accepted the honor and the responsibility. The institute has been under capable direction during the nearly two years that have elapsed since the resignation of President Pritchett. Acting President Noyes has maintained its high standards and manifested a degree of executive skill that probably would have given him the full title and lodged the full authority of the position in his hands had he been disposed to accept them. But his chosen field of chemical research has possessed more attractions for him. In it he has opportunity to blaze new trails in scientific advance, and he is to be commended for his clear and loyal following of his own light and leading in this matter.

The new president evidently understands in its general features the nature of the work to which he has been called, and his record in educational service indicates that he is one

who readily becomes master of detail. The experience will be not less new to him than to the institution, which now for the first time will be under the direction of a man born in another country and trained in foreign schools and universities. That is not necessarily an objection. It may prove a positive gain. Professor MacLaurin is a comparatively young man. His attainments are more than excellent; they are extraordinary, and few men of his years have won more flattering recognition from sources that bear the stamp of authority.

Of course, mere scholarship, even of the highest order, is not enough to meet all the requirements of this new responsibility. His executive ability and his adaptability can be proved only by actual service. But Scotch scholars are thorough; their standards are high and shrewdness and personal tact are among their national characteristics. When Princeton called Dr. McCosh to the presidency, he was a man well along in years, but a famous metaphysician, and he filled the place with distinction. The institute does not need metaphysicians, and the new president has not turned his researches in that direction. He has made great advances in modern science; he is learned in the principles of law and is undoubtedly an enthusiast with respect to the various lines of research with which he has been so conspicuously identified. The institute authorities, the alumni and the public have a well-grounded hope that under his administration a new era of prosperous service will open up for this famous school.—*The Boston Transcript*.

BURDENS OF COLLEGE PRESIDENTS

PRESIDENT ELIOT's impending retirement from the presidency of Harvard is bound to give an impetus to the movement to divide the functions of that office. "The governing boards and the alumni will understand better in six months than they do even now what a void Eliot will leave," writes one of the most prominent of the Boston alumni. But this is not only because Mr. Eliot towers above all other college presidents and is the foremost American citizen. The magnitude of his office is such that it would be a most difficult